

but no trace of delicate belt north of equatorial zone, observed on March 16th and 18th and on 7th April. *Shadow of ball.*—As the notch now projects very little beyond the outline of the shadow, it is very difficult to make out.

11th April, 8^h 30^m to 8^h 55^m. Definition variable. Fine clear night; wind E. Powers used, 284, 350. *Rings.*—A. No detail seen. C. Irregular border glimpsed several times on *p* ansa. *f* ansa very obscure.

14th April, 8^h 30^m to 9^h 0^m. Definition excellent. Wind N.E. Powers used, 284, 350, 420. *Rings.*—A. Encke's division steadily seen on both ansæ. B. As on 16th March. C. With all the eyepieces the inner edge of the *p* ansa is clearly serrated. Dark spots again visible on *f* ansa. *Belts.*—Beautifully distinct; faint belt north of equatorial zone, first seen on 16th March, traced from limb to limb.

20th April, 8^h 20^m to 9^h 0^m. Definition pretty good. Powers used, 284, 350. *Rings.*—A. No detail visible. C. Both ansæ very dark. Irregular border of *p* ansa evident. The surface of ring in *f* ansa is manifestly irregular in tone, though no definite spots can be distinguished.—*Belts* not favourably seen. *Shadow of ball.*—It requires some attention to see the notch this evening; even at times of best definition there is hardly a recognisable projection at the Cassini division.

After this date, though several observations were attempted, the increasing duration of twilight and unfavourable weather prevented the details of the planet from being seen to advantage.

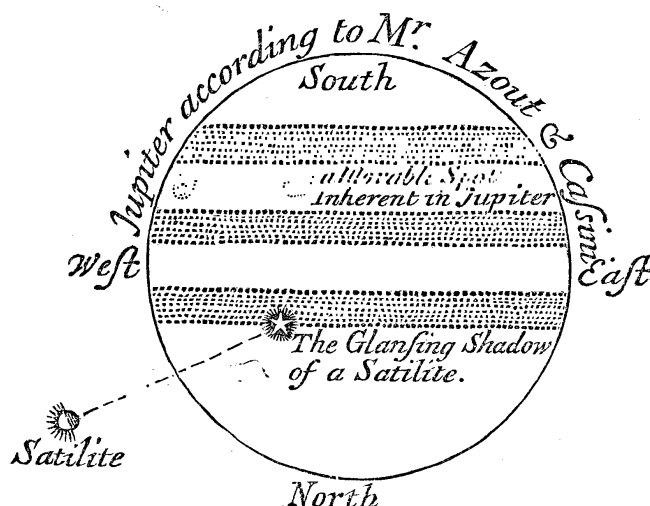
Kempston, Beds:

1887, June 6.

On an old Engraving of Jupiter. By Captain W. Noble.

The other day, in the valuable library of old astronomical works belonging to my friend Mr. C. Leeson Prince, F.R.A.S., I came across a curious little volume, described on its title-page as "Atlas Cœlestis, containing the Systems and Theories of the Planets, the Constellations of the Starrs. Sold by Ben Bragg in Paternoster Row." Neither the author's name nor the date of publication is appended; but the name of "John Seller" appears in the corner of one of the plates, and, from a note in the body of the work with reference to an eclipse, it must have been published in 1680. Presumably this is the same John Seller who was the author of a quarto treatise on navigation which appears in the catalogue of our own library, and who produced a variety of books on arithmetic, astronomy, and navigation between the years 1671 and 1711. My immediate object, however, is to invite attention to one of Mr. Seller's engravings, which, through the kindness of Mr. Prince, I am able to reproduce in fac-simile.

The interest which I conceive to attach to this resides in the fact that the “movable spot inherent in *Jupiter*” shown in this old engraving is situated in precisely the same part of the planet’s disc as the familiar red spot which has been watched of late years by so many scores—not to say hundreds—of observers. I have no means of access to Auzout’s observations; but the early volumes of the *Philosophical Transactions* contain several notices of those of Cassini; and I have little doubt that one in the first volume (January 8, 1666), p. 143—“Of a permanent spot in *Jupiter*, by which is manifested the conversion of *Jupiter* about his own axis”—has reference to the very marking which Sellers draws. The words are these: “Besides that transient shadow” (of a satellite) “last mentioned * there hath been observed by Mons. Cassini a permanent spot in the disque of



Jupiter; by the help whereof he hath been able to observe not onely that *Jupiter* turns about upon his own axis, but also the time of such conversion, which he estimates to be $9^h 56^m$." Again, on p. 172 of the same volume (February 1666), after speaking of changes in “the three obscure belts” of *Jupiter* detected by Cassini, the account goes on to say that he (Cassini) “hath at length discovered a permanent spot in the northern part of the most southern belt, by the means whereof he hath concluded that *Jupiter* turns about his axis in 9 dayes” (an obvious *lapsus* for hours) “56 minutes.” This is followed by a somewhat elaborate argument to show that the spot is actually attached to the surface of the planet, from the different manner in which it and the shadow of a satellite behave in traversing *Jupiter*’s disc; and then the account goes on to say that Cassini “hath calculated many tables whereof he gives the explication and use in the letters by him addressed to the Abbot Falconière. By the means of them one may know when this spot may be seen by us . . . and shews by his tables what is to be added or

* This is, I suspect, the “Glancing Shadow of a Satellite” of the engraving.—W. N.

subtracted to know at what time the said spot is to come into the middle of *Jupiter's* diske." In all of which Cassini only anticipated Mr. Marth by two hundred years or so. In connection with this it is noteworthy that in the year 1858 a remarkable dark spot appeared upon the face of *Jupiter*, in the same part of his disc. My first intention was to have copied a drawing of my own, made at this date, to illustrate this, but I find one by Mr. Lassell on p. 52 of vol. xix. of the *Monthly Notices*, in which the spot is depicted. Putting all this together, it would appear that a permanent source of disturbance exists in a very circumscribed region to the south of *Jupiter's* equator, and that in observing the red spot we are probably only watching the marking by which the first determination of *Jupiter's* period of rotation was ever made.

On Prof. G. W. Hill's Paper on Delaunay's Method.
By Edmund Neison.

It had been my intention to have passed over in silence Prof. Hill's paper in the November number of the *Monthly Notices*, entitled, "A Reply to Mr. Neison's Strictures on Delaunay's Method of Determining the Planetary Perturbations of the Moon;" but it has been pointed out to me that, as the question involved is one which cannot readily be followed by most astronomers, it is proper that I should make known my dissent from the superficial criticisms urged by Prof. Hill, based as they are on so much misconception, betraying as they do such imperfect acquaintance with the previous history of the question, and supported as they are by no evidence beyond strong unsupported assertion. The whole paper is unjustifiable, unless we accept as incontrovertible the point of view from which the whole is written—namely that, because I differ from Delaunay, I must have a confused, erroneous conception of his method, and must be entirely in the wrong! The very keynote to the tone of the paper is given in almost the opening paragraph, that "If we were obliged to admit the validity of *all* the statements in this article, an easy corollary from them would be that Lagrange's general method of the variation of arbitrary constants in the problems of mechanics was a blunder. Now, I think that no one acquainted with this method could, for a moment even, entertain such a proposition. Hence, we may conclude there is some flaw in the reasoning of this paper." As a simple assertion this is strong enough and, polemically, may be good, but if Prof. Hill undertakes to substantiate his assertion it will be *he* who will have made the blunder.

I do not wish even to seem wanting in courtesy to Prof. Hill, whose valuable contributions to the Lunar Theory have always commanded my warmest admiration; but I cannot admit that the objections raised by him in this paper are such as to call for any serious reply.

Perhaps there are two points which might be noticed.